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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,781	02/18/2004	Ji-Yong Park	6161.0111.US	1632

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EXAMINER
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LANDAU, MATTHEW C

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 11/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

47K

<b>Office Action Summary</b>	<b>Application No.</b> 10/779,781	<b>Applicant(s)</b> PARK ET AL.	
	<b>Examiner</b> Matthew Landau	<b>Art Unit</b> 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-48 is/are pending in the application.
- 4a) Of the above claim(s) 2,5-7,9-12 and 14-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 47 and 48 is/are rejected.
- 7) ☒ Claim(s) 3,4,8 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Claims 2, 5-7, 9-12, and 14-46 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention/species, there being no allowable generic or linking claim. Election was made **without** traverse during the telephone conversation with Hae-Chan Park (Reg. #50,114) on June 21, 2005, and was confirmed in the reply filed 9/27/2005.

In response to Applicant's arguments that "the subject matter of all claims is sufficiently related that a thorough search for the subject matter of any one Species would encompass a search for the subject matter of the remaining Species", the Examiner respectfully disagrees. A search for one of the species would not necessarily encompass a search for the other species. Further, examining all eight species in the same application would present a serious burden on the examiner, since each species contains a mutually exclusive characteristic. However, if Applicant states for the record that the different species are merely obvious variants of one another, the election of species requirement will be withdrawn.

### ***Drawings***

The drawings were received on 9/27/2005. These drawings are acceptable.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 47 and 48 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation “an average number of grain boundaries of polycrystalline silicon formed in active channel regions of the driving thin film transistor and meet a current direction line is a *natural number*” (emphasis added) is not enabled by the originally filed application. The specification does not specify that the average number of grain boundaries is a natural number, nor does it explain how one would ensure that the average number of grain boundaries is a natural number. The exact number of grain boundaries in each transistor channel would have to be precisely controlled in order to ensure that the average number is an integer and not a fraction. That amount of control seems highly unlikely if not impossible. Even if it were possible, Applicant has certainly not described how to obtain that amount of control. Note that although the figures show a certain number of grain boundaries in a driving TFT, they do not show the number of grain boundaries in *each* TFT. Therefore, they do not show the average number of grain boundaries. Furthermore, the figures are merely diagrammatic representations and cannot

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be relied upon as a disclosure of the actual number of grain boundaries in a channel region.

Therefore, use of the limitation "natural number" constitutes new matter.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 47 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 47 recites the limitation "the organic electroluminescent device" in line 4 of the claim. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Objections***

Claims 3, 4, 47, and 48 are objected to because of the following informalities:

Regarding claim 3, the limitation "the grain boundaries are side grain boundaries" is objected to. It is suggested the limitation be changed to "the grain boundaries include are side grain boundaries" to be more consistent with amended claim 4.

Regarding claims 4 and 48, the limitation "active channel regions of the thin film transistor installed at the pixel portion" is objected to. It is suggested the limitation be changed to "an active channel region ~~regions~~ of the thin film transistor installed at the pixel portion", or otherwise amend the claim to indicated that there is more than one thin film transistor in the

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pixel portion, since there can be only one channel region in a thin film transistor. Note that claim 47 has similar problems

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 48 is rejected under 35 U.S.C. 102(b) as being anticipated by Miyanaga et al. (US Pat. 5,705,829, hereinafter Miyanaga).

Regarding claim 48, Figures 1 and 5F of Miyanaga discloses a flat panel display device (liquid crystal display) comprising: a pixel portion divided by gate lines and data lines and equipped with a thin film transistor (TFT) (Figure 5F) driven by signals applied by the gate lines and data lines; and a driving circuit portion comprising one or more TFTs (Figure 5F) connected to the gate lines and data lines respectively to apply signals to the pixel portion, wherein the one or more thin film transistors at the driving circuit portion include an average number of grain boundaries of polycrystalline silicon which are formed in active channel regions that meet a current direction line is a natural number that is at least one or more less than the average number of grain boundaries of polycrystalline silicon which are formed in active channel regions of the TFT installed at the pixel portion and meet a current direction line for a unit area of active channels. Note that Miyanaga discloses the grain boundaries in the channel of the driving

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(peripheral) TFT extend parallel to the current direction and that the grain boundaries in the channel of the pixel (switching) TFT extend perpendicular to the current direction (col. 2, lines 30-50 and col. 8, lines 42-51). Therefore, it is inherent that the number of grain boundaries the meet (i.e., intersect) the current direction in the driving TFTs is zero, and therefore less than that of the pixel TFTs. Miyanaga also discloses that that peripheral region (driving TFT region) is irradiated with laser light to improve crystallinity (col. 7, lines 11-15). By performing this irradiation, the grain size with increase, thereby reducing the number of grain boundaries in the channel. This disclosure further supports the above statement of inherency. Note that the set of natural numbers can be considered to include "0". Applicant has not specifically defined "natural number" in a manner that would preclude this interpretation.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroshima et al. (US PGPub 2004/0079944, hereinafter Hiroshima) in view of Miyanaga.

Regarding claim 47, Figure 8 of Hiroshima discloses an organic electroluminescent device comprising switching TFTs and driving TFTs (paragraph [0068]). Hiroshima does not disclose the specific limitations regarding the average number of grain boundaries in the channel

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regions of the switching and driving TFTs. Figures 1 and 5F of Miyanaga discloses a flat panel display device (liquid crystal display) comprising: a switching TFT for transmitting data signals; and a driving TFT for driving the display device so that a certain amount of current flows through the device according to the data signals, wherein the average number of grain boundaries of polycrystalline silicon which are formed in active channel regions of the driving TFT and meet a current direction line is a natural number that is at least one or more less than the average number of grain boundaries of polycrystalline silicon which are formed in active channel regions of the switching TFT and meet a current direction line for a unit area of active channels. Note that Miyanaga discloses the grain boundaries in the channel of the driving (peripheral) TFT extend parallel to the current direction and that the grain boundaries in the channel of the pixel (switching) TFT extend perpendicular to the current direction (col. 2, lines 30-50 and col. 8, lines 42-51). Therefore, it is inherent that the number of grain boundaries the meet (i.e., intersect) the current direction in the driving TFTs is zero, and therefore less than that of the pixel TFTs. Note that the set of natural numbers can be considered to include "0". Applicant has not specifically defined "natural number" in a manner that would preclude this interpretation. In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Hiroshima by including the TFT structures taught by Miyanaga. The ordinary artisan would have been motivated to modify Hiroshima in the manner described above for the purpose of obtain an organic electroluminescent display wherein the OFF current of the switching TFT is minimized and the current mobility in the driving TFT is increased (col. 8, lines 42-53).



***Allowable Subject Matter***

Claims 3, 4, 8, and 13 would be allowable if rewritten or amended to overcome the claim objections, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 4, the prior art of record, either singularly or in combination, does not disclose or suggest the combination of limitations including the polycrystalline silicon grain boundaries formed in the active channel regions of the thin film transistor installed at the pixel portion include primary polycrystalline grain boundaries that are inclined to the current direction line at an angle of above  $-45$  to  $45^{\circ}$ .

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Response to Arguments***

Applicant's arguments filed September 27, 2005 have been fully considered but they are not persuasive.

In response to Applicant's arguments that "in Miyanaga, the number of grain boundaries of the periphery circuit that meet the current direction line is zero and not a natural number", it is noted that the set of natural numbers does not necessarily exclude zero. It is known that the set of natural numbers can be considered to include zero. Ahluwalie et al. (US PGPub

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2005/0227130) discloses that zero is included in the set of natural numbers (see paragraph [0037]). Applicant has not specifically defined “natural number” in a manner to preclude this interpretation.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (571) 272-1731.

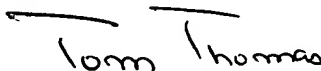
The examiner can normally be reached from 8:30 AM - 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone numbers for the organization where this application or

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proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for

After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should any questions arise regarding access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TOM THOMAS  
SUPERVISORY PATENT EXAMINER

Matthew C. Landau

November 2, 2005